
A New Species of *Phacelia* (Hydrophyllaceae) from Southern Arizona, U.S.A.

Steven P. McLaughlin

Office of Arid Lands Studies, University of Arizona, Tucson, Arizona 85721, U.S.A.
spmcl@ag.arizona.edu

ABSTRACT. *Phacelia sonoitensis* S. P. McLaughlin (Hydrophyllaceae) from Santa Cruz County, Arizona, U.S.A., is described and illustrated. The distinctive features of this species are its combination of pinnate leaves and several shallowly cymbiform seeds. The number of seeds per capsule (15 to 30) and seed morphology are not consistent with any currently recognized section of the genus.

RESUMEN. En este trabajo se describe e ilustra *Phacelia sonoitensis* S. P. McLaughlin (Hydrophyllaceae) del condado de Santa Cruz en Arizona, EE. UU. Las características distintivas son sus hojas pinnadas y varias semillas ligeramente cimbiformes. El número de semillas por cápsula (15 a 30) y la morfología de las semillas no concuerdan con ninguna sección del género reconocida actualmente.

Key words: Arizona, Hydrophyllaceae, *Phacelia*, Sonoita Creek State Natural Area.

There are approximately 150 species of *Phacelia* Jussieu (Hydrophyllaceae); most are from the western United States (Mabberley, 1993), and many are winter annuals of arid and semiarid habitats. Several collections of an unusual *Phacelia* were made as part of a floristic survey of the Sonoita Creek State Natural Area (SCSNA) in Santa Cruz County, southern Arizona, U.S.A., adjacent to the Mexican state of Sonora. These plants have pinnate leaves and 15 to 30 shallowly cymbiform seeds per capsule, a unique combination of character states within the genus.

Phacelia sonoitensis S. P. McLaughlin, sp. nov.
TYPE. U.S.A. Arizona: Santa Cruz Co., Sonoita Creek State Natural Area, south-facing rock talus, UTM 12R, E 0506300, N 3486320, 1170 m, 30 Mar. 2001, S. P. McLaughlin 9123 & B. Lewis (holotype, ARIZ; isotypes, ASU, MO).
Figure 1.

Herbae annuae foliis pinnatis et trichomatibus glandulosis, multicellularibus; sepala anguste spatulata; capsulae oblongae, 5–7 mm longae; semina 15 ad 30, vadoso-cymbiformia.

Annual herbs to 50 cm in height; stems lax, ascending, branched toward the base in robust individuals, sparsely puberulent with longer straight, pustulate-based, unicellular simple trichomes and multicellular glandular trichomes. Leaves mostly cauline, 3–10(–15) cm, pinnate with 5 to 9 sessile or more commonly short-petiolate, toothed to shallowly lobed leaflets, mostly 5–15(–30) × 4–10(–20) mm, pubescent on both surfaces with mostly long, narrow stipitate glandular trichomes. Inflorescence a terminal helicoid cyme at the end of each branch, to 12 cm in fruit. Flowers on pedicels 1–2 mm; calyx glandular and hirsute, lobes narrowly spatulate, 4–6 mm; corolla tubular to narrowly campanulate, 6–8 mm, tube white, lobes blue; stamens included; style 3 mm, branches less than 1 mm. Capsules on pedicels 2–3 mm, oblong, 5–7 mm, calyx in fruit 6–10 mm; seeds 15 to 30, (1–)1.5–2 mm, ovate, thin, shallowly cymbiform with a low central ridge, tessellate-pitted.

Habitat and phenology. Plants of *Phacelia sonoitensis* have been found on the SCSNA in Arizona on talus and rocky slopes at 1140–1250 m elevation in suffrutescent, semiarid plant communities generally mapped as semidesert grasslands. To date the species is known only from the SCSNA, but similar habitat exists in southern Arizona and northern Sonora. Associated species include *Agave schottii* Engelm., *Eysenhardtia polystachya* (Ortega) Sargent, *Fouquieria splendens* Engelm., *Plumbago scandens* L., *Erythrina flabelliformis* Kearney, *Prosopis velutina* Wooton, *Sphaeralcea laxa* Wooton & Standley, *Mimosa* L. spp., *Celtis pallida* Torrey, and *Morus microphylla* Buckley. Collections with flowers and fruits have been made in March and April.

Vegetatively, *Phacelia sonoitensis* resembles *P. cryptantha* Greene, a species of northern and central Arizona. Both have pinnate leaves with ovate, shallowly lobed leaflets, multicellular glandular trichomes, and distinctly spatulate calyx lobes. *Phacelia cryptantha* differs from *P. sonoitensis* in its short cymes, hispid calyx lobes, and short, round capsules with just four seeds per capsule, which are pitted but not cymbiform.

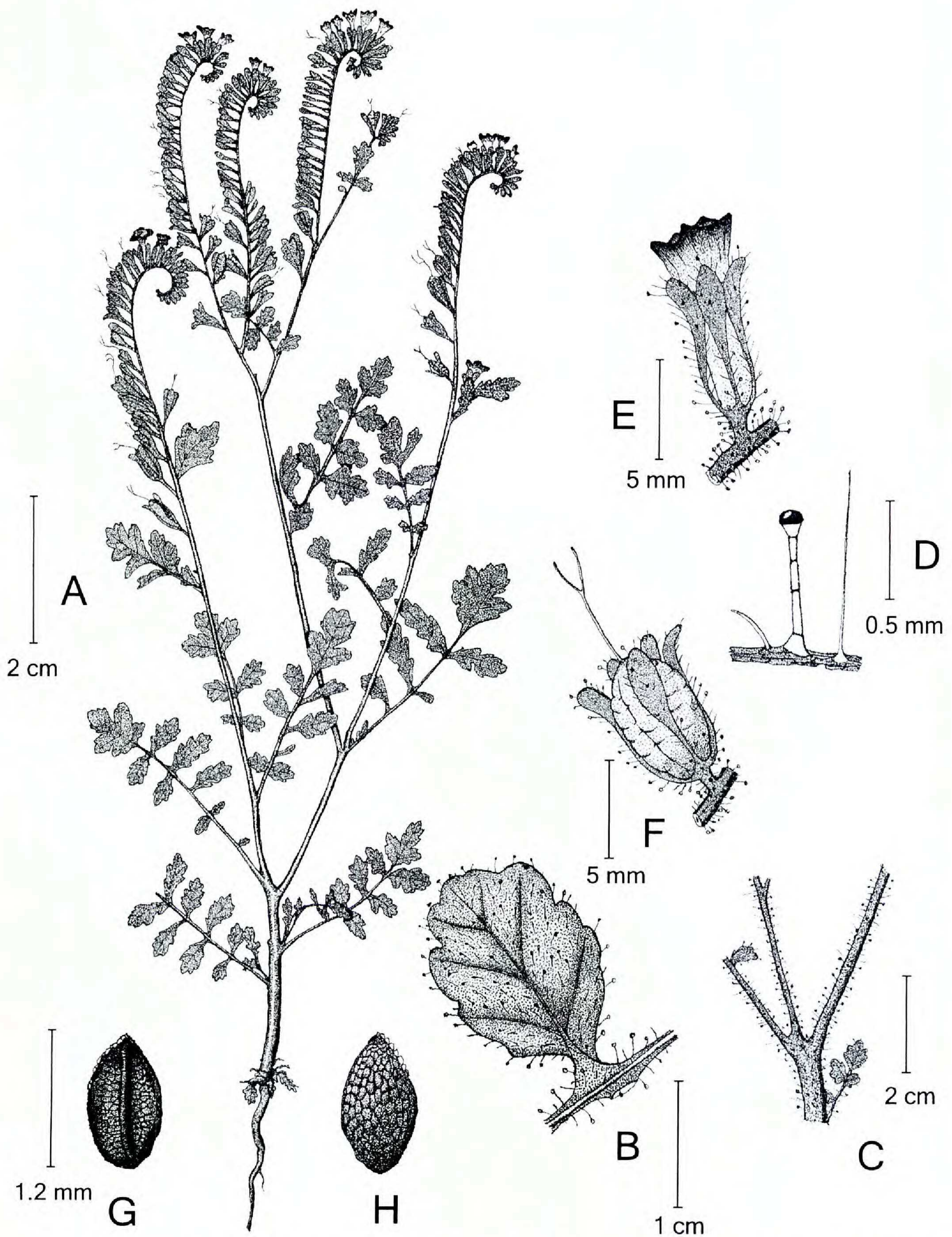


Figure 1. *Phacelia sonoitensis* S. P. McLaughlin. —A. Habit. —B. Leaflet. —C. Stem, showing mixture of trichomes. —D. Detail of trichomes. —E. Flower. —F. Capsule. —G. Seed, ventral view. —H. Seed, dorsal view. Drawn by Philip Jenkins from the holotype, *McLaughlin 9123 & Lewis* (ARIZ).

Five other species of *Phacelia*, all winter annuals, occur at the SCSNA: *P. affinis* A. Gray, *P. arizonica* A. Gray, *P. bombycina* Wootton & Standley, *P. coerulea* Greene, and *P. distans* Benth. *Phacelia affinis* belongs to section *Euglypta* S. Watson (Howell,

1946), characterized by having numerous small, transversely corrugate seeds. *Phacelia arizonica*, *P. bombycina*, *P. coerulea*, and *P. distans* are all in the *P. crenulata* Torrey ex S. Watson complex (Atwood, 1975) of section *Phacelia*, with just four or fewer

more-or-less cymbiform seeds per capsule that are thin, boat-shaped, and ventrally excavated on either side of a central, longitudinal ventral ridge. Because *P. sonoitensis* has numerous seeds that are shallowly cymbiform, it does not clearly belong to either section *Euglypta* or section *Phacelia*. The species of section *Eutoca* (R. Brown) Brand (Brand, 1913) also have several seeds per capsule, but these are generally more-or-less angled rather than cymbiform. The combination of having more than four cymbiform seeds per capsule apparently is not found in any other species of *Phacelia*.

When I first encountered this plant I thought it might be an intersectional hybrid (F_1) between *Phacelia affinis* and perhaps *P. distans*, although neither of the latter species typically occurs on the rocky slopes favored by *P. sonoitensis*. Through additional fieldwork, however, I found plants of *P. sonoitensis* to have a stable, predictable set of morphological characters that recur in several distinct populations; I found no evidence of segregation of these traits in F_2 -like populations.

Paratypes. U.S.A. **Arizona:** Santa Cruz Co., SCSNA, Coal Mine Canyon, on south-facing slope, UTM 12R, E 0508360, N 3486340, 1170 m, 25 Mar. 2001, S. P. McLaughlin 9088 & B. Lewis, A. Thorne & J. Jordan (ARIZ, RSA); SCSNA, drainage W of Fresno Canyon, on rocky slope, UTM 12R, E 0506690, N 3486380, 1145 m, S. P.

McLaughlin 9205 (ARIZ, ASU, OSC); SCSNA, near E boundary on rocky east-facing slope, UTM 12R E 0510340, N 3485330, 1240 m, 18 Apr. 2001, S. P. McLaughlin 9226 & B. Lewis (ARIZ, BRY).

Acknowledgments. I thank all of those who assisted in looking for this plant in the field, particularly Betsy Lewis, but also George Montgomery, Mills Tandy, Anne Thorne, Jim Jordan, and members of the Arizona Native Plant Society. This species was discovered while working on a project funded by Arizona State Parks. Edward Gilbert helped with the electronic aspects of manuscript submission. Richard Halse provided a very helpful review of an early draft of this manuscript, and Gary Hamman and Duane Atwood provided thorough and critical reviews. Special thanks to Philip Jenkins for his excellent illustration.

Literature Cited

- Atwood, N. D. 1975. A revision of the *Phacelia crenulatae* group (Hydrophyllaceae) for North America. *Great Basin Naturalist* 35: 127–190.
- Brand, A. 1913. Hydrophyllaceae. In A. Engler (editor), *Das Pflanzenreich IV* (251), Heft 59: 1–210.
- Howell, J. T. 1946. A revision of *Phacelia* sect. *Euglypta*. *Amer. Midl. Naturalist* 36: 381–411.
- Mabberley, D. J. 1993. *The Plant Book: A Portable Dictionary of the Vascular Plants*. Cambridge Univ. Press, Cambridge.